Appendix B

Response to Pubic Comments

This appendix summarizes public comments made on the *Draft Report: Total Maximum Daily Load for Total Dissolved Gas in the Mid-Columbia River and Lake Roosevelt*, posted to the Web on February 9, 2004.

The TMDL is a joint effort of the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA). Ecology's portion of the TMDL addresses state waters below Grand Coulee Dam. EPA addresses waters of Lake Roosevelt and Colville Tribal waters below Grand Coulee Dam. Appendix A, *Summary Implementation Strategy*, was written as a collaboration between Ecology and the Spokane Tribe.

Comments received by both Ecology and EPA are being addressed in this appendix. Responses pertinent to state waters below Grand Coulee Dam were addressed by Ecology. EPA responded to comments pertaining to Lake Roosevelt or Colville Tribal waters below Grand Coulee Dam. Comments that addressed the *Summary Implementation Strategy* were responded to by Ecology and the Spokane Tribe.

General Comments

Comment:

The guidelines put forth in this document are difficult to follow because of the dual loading capacity metrics (delta Pressure and total dissolved gas saturation), multiple jurisdictions, (State of Washington, Colville and Spokane Tribes, Canada), seasonal exceptions (fish passage versus non-passage), short term versus long term components (phase 1 versus phase 2), ESA monitoring versus CWA monitoring, and variation in compliance regions and seasons. Would it be possible to present these variations in a single table for the appropriate river reaches?

Response:

A table is now included in Appendix A. Thanks for the suggestion. Note that some compliance locations are expressed as a range of distance rather than a specific, single location.

Comment:

NEPA/SEPA analysis is appropriate.

The role of this TMDL as an action requiring NEPA/SEPA review is somewhat ambiguous in the document. The document states "a TMDL is a planning tool, not a rule of law or stand-alone enforceable document".' However, in the same paragraph it states that "TMDLs may be used to condition exemptions, modifications, variances, permits, licenses, and certifications." The

statements appear to be contradictory. While the TMDL itself may not initiate an action, Ecology and other agencies will certainly use it as justification for regulatory actions and may require that agency decisions regarding permits, certifications, licenses and other regulatory procedures conform to the allocations and implementation plans expressed within this TMDL. Given this level of importance, it would be appropriate to treat this TMDL as a significant rulemaking activity that should be reviewed in conformance with the requirements of the National Environmental Policy Act or Washington State Environmental Policy Act.

The implementation plan, particularly for long-term compliance, could have significant environmental effects for both aquatic life and other environmental concerns. For example, major structural changes to the projects, such as raised stilling basins and tailraces, side channels, submerged spill and other major changes to the river bed or project structures, may be the only way that the current water quality standard of 110% TDG can be accomplished for involuntary spill at levels approaching the 7Q10 flows. The U.S. Corps of Engineers DGAS Program identified that a number of these potential options would pose risk of injury to fish. Certainly, the raised tailrace option would have impacts to habitat for sturgeon and other non-salmonid fish in the Columbia River. While a NEPA/SEPA analysis may not technically be required for the TMDL, the delineation of environmental impacts that could result from measures taken to meet the 110% TDG standard would be an appropriate and responsible action for Ecology to undertake as part of the process for establishing the TMDL and implementation plan. Certainly, the environmental and social consequences of meeting the load allocations established in the TMDL should be reviewed prior to using the TMDL to "condition exemptions, modifications, variances, permits, licenses, and certifications".

Response:

The state environmental agencies do not take any environmental action or decision by preparing and submitting load allocations to EPA for their approval, nor does EPA by issuing TMDLs or taking action on TMDLs submitted by the state. The future "exemptions, modifications, variances, permits, licenses, and certifications" that could be required as a result of the TMDL, are the actions that could trigger NEPA/SEPA. That would be the appropriate time to initiate environmental review on the proposed actions. NEPA/SEPA at this time would be highly speculative and imprudent. Therefore no national or Washington State Environmental Procedures Act process is required or appropriate.

Comment:

The TDG TMDL should include more focus on biological outcomes.

The *Summary Implementation Strategy* states that "care needs to be taken not to implement gas abatement measures that may benefit water quality, while damaging the beneficial uses, such as juvenile migration, that the federal Clean Water Act was designed to protect." Chelan PUD strongly agrees with this statement and believes that such an outcome-based approach should be the foundation of the TDG TMDL as well as any temperature TMDL. EPA and Ecology's priority should be working cooperatively with Chelan PUD and others to protect fish and other beneficial uses of the waters of Washington State, including hydropower, not mechanical

compliance with numeric water quality standards regardless of impacts on existing beneficial uses and issues of cost and practicality.

Such an outcome-based approach is strongly supported by EPA regulations which provide that "States must adopt those water quality criteria that protect the designated use." 40 C.F.R. § 131.11(a). This regulation makes it clear that the purpose of the numeric criteria in water quality standards is to protect designated uses, not to achieve the criteria regardless of their impact on designated uses and existing beneficial uses.

EPA Administrator, Mike Leavitt's Enlibra Doctrine echoes this approach:

A clean and safe environment will best be achieved when government actions are focused on outcomes, not programs and processes, and when innovative approaches to achieving desired outcomes are rewarded. Federal, state and local policies should encourage "outside the box" thinking in the development of strategies to achieve desired outcomes. Solving problems, rather than just complying with programs, should be rewarded.

This common sense approach was also supported by the U.S. Supreme Court in Jefferson County v. Washington Department of Ecology, 511 U.S. 700 at 713 (1994), where the Court rejected the contention that the Clean Water Act only contemplates enforcement of numeric criteria. Ecology has taken important steps in their water quality standards and this TMDL toward recognizing that the protection of beneficial uses, the outcome, is the purpose of standards and that the tools, numeric and narrative criteria contained in the water quality standards, can be adjusted to better achieve the outcome. The special dissolved gas conditions for the Columbia River (WAC 173-201A(060)(4); WAC 173-201A-200(1)(f)) embody this recognition. However, the TMDL and SIS still revert back to the existing numeric criterion of 110 percent TDG saturation as the ultimate goal, despite the years of research demonstrating that the higher levels of TDG saturation allowed under the special condition are fully protective of the designated and existing aquatic life uses in the Columbia River. This TMDL and SIS should base load allocations and long-term compliance objectives on attaining TDG levels that are necessary to protect aquatic life, rather than returning to outdated criteria that have repeatedly been shown to be unnecessarily restrictive and detrimental to other beneficial uses.

Response:

High dissolved gas concentrations can be lethal and damaging to a variety of aquatic organisms, the operation of dams can generate excessive dissolved gas, and slack water impoundments hinder natural degassing. The operation of dams to provide spills for fish passage is in response to the finding that mortality associated with turbine passage is higher than mortality from high TDG and spillway passage. Despite the excessive generation of TDG, spill is the preferred method of passage available at this time. High TDG has been shown to be detrimental to aquatic organisms, and the criteria for TDG help to minimize this negative effect.

Reduction of levels of dissolved gas is possible. Some dams have instituted measures to pass high flows without generation of additional dissolved gas. The water quality standards promote a balance of beneficial uses by protecting the most sensitive use, not an exclusive use by one water user. Hydroelectric generation, although not dependent on water quality that supports aquatic life, can be accomplished effectively in a way that meets the TDG criteria. Ecology and

the Spokane Tribe are proposing to implement this TMDL in a way that allows a balance in protecting all beneficial uses.

Comment:

Only reasonable measures should be included in the TDG TMDL.

Chelan PUD agrees with the statement in the TMDL that structural solutions to TDG are dependent on budgeting limitations of the Public Utility Districts. Chelan PUD also agrees with the statement in the *Summary Implementation Strategy* that amendment of water quality standards may be necessary if the requirements of the TDQ TMDL are not "achievable." We recommend that these statements be clarified to make it clear that Chelan PUD and other dam owners should only be required to implement "reasonable" measures related to compliance with standards and criteria that are shown necessary to protect the aquatic life designated uses, without unduly impairing other beneficial uses of the Columbia River. Such an approach is required under Washington State law which provides for "the use of all known available and reasonable methods by industries and others to prevent and control" pollution. RCW 90.48. It is also required by the Clean Water Act which provides that water quality standards shall be established taking into consideration the use of water for a wide variety of purposes, including "public water supplies, propagation of fish and wildlife, recreational" and "industrial" use such as hydroelectric generation. 33 U.S.C. § 13 13(c)(2).

Response:

The provision for "the use of all known available and reasonable methods by industries and others to prevent and control" in state law refers to measures that are required of all discharges to waters of the state regardless of the condition of the receiving waters. There is no limit expressed in the statutes for the measures that are required in complying with water quality standards.

There are provisions in federal policy [Guidelines for Deriving Aquatic Site-Specific Water Quality Criteria by Modifying National Criteria, EPA 600/3-84-099, October 1984] that allow site-specific water quality criteria in situations where local conditions justify less stringent criteria. The development of site-specific criteria must include rule-making.

Nevertheless, the TMDL is a plan which provides loading reductions that are implemented through other mechanisms. In the case of Chelan PUD, the FERC 401 Certifications will be the process to develop alternatives and select options to comply with the water quality standards.

Comment:

TDG TMDL needs further emphasis on ensuring the fish survival requirements of the HCPs for the Rocky Reach and Rock Island Projects are met.

Chelan PUD agrees that a priority in Phase 1 of the implementation activities should be "ensuring the fish passage requirements of the 2000 Biological Opinion are met" for the Federal Columbia River Power System (FCRPS). We also appreciate the discussion regarding the

Rocky Reach, Rock Island, and Wells Habitat Conservation Plans (HCPs), and that ensuring the fish survival requirements in the HCPs and Biological Opinions are given the same emphasis as such requirements in the 2000 BO for the FCRPS. Additional spill requirements, structural modifications, or changes to Project operations, if focused solely toward reducing TDG, could undermine Chelan PUD's ability to operate the projects to meet the objectives of the HCPs. For example, the spill gate settings most effective for reducing TDG may not be the gate settings most effective for meeting fish survival objectives, thus defeating the primary objective of water quality standards and the TMDL, providing protection for aquatic life.

Response:

The HCPs and the Biological Opinions that accompany them adequately address the relationship between TDG and the fish survival goals. The TDG TMDL supports fish survival goals through a balance between water quality standards and the Biological Opinion.

Comment:

TMDL should incorporate powerhouse flows into mixing zone for compliance point

The Draft TMDL contains a basic flaw in the designation of load allocations and compliance points. The allowable load, or loading capacity, of a pollutant is the amount of pollutant that the waterbody can receive and meet water quality standards. In the case of mainstem Columbia hydroelectric projects, the flows from the spillway and powerhouse mix at some point downstream from the project. Unless the powerhouse flow has equal or greater TDG pressure than the spillway flow, the spillway flow will be diluted by powerhouse flow and the resultant TDG pressure will be less than TDG measured at the end of the aerated zone below the spillway. The Draft appropriately sets the load allocation for a hydroelectric project equal to the loading capacity less background loads, yet incorrectly sets the compliance point at the end of the aerated zone below the spillway, without consideration of the dilution of TDG pressure as the spillway flow mixes with powerhouse flow. Since spillway flows are generally much lower than powerhouse flows, the point of compliance should either be at a location where flows are mixed or the load allocation should be increased according to the degree of dilution that occurs after mixing. As Ecology is aware, there is ample authority under Federal and State water quality regulations for the use of mixing zones when determining compliance with numerical water quality criteria. In the case of TDG, an extended mixing zone is appropriate. The 115% standard for the forebay of the next project downstream, as contained in the Washington water quality standard special condition, is an appropriate application of an extended mixing zone for determining compliance.

Without giving some credit for mixing and dilution, there would be no benefit, in terms of compliance, for reductions in spill volume. In this sense, the compliance point in the Draft TMDL is inconsistent with the proposed implementation activities that include a number of measures to reduce the volume of involuntary spill and spills for fish passage. The compliance point at the end of the aerated zone will not accurately reflect the reduction in load, or benefit, of actions that reduce spill volumes because the compliance point does not include the effect of dilution. If the compliance point remains the same, then the load allocation should be increased proportional to the percentage of river flow coming through the spillway to incorporate dilution

such that the level of TDG does not exceed 115% at the forebay of the downstream hydroelectric project.

Response:

Ecology must respectfully disagree regarding dilution of flows. The compliance point for TDG at the downstream end of the aerated zone includes a larger area where compliance with standards is not required than would be allowed for a point source discharger subject to a NPDES permit. The non-fish passage TDG criterion of 110% is to be met "at any point of sample collection" (Chapter 173-201A WAC). As the discussion in the TMDL states, the use of the entire Columbia River for dilution is not appropriate (unless unavoidable, such as at Wells Dam). In addition, each dam cannot control upstream TDG levels, which may be higher than the TDG produced by the spill. The rationale is not clear as to why the commenter believes that not allowing dilution eliminates incentives to reduce spill. Spill volume is the single largest operational factor in TDG production, so compliance in the areas of least dilution would tend to push for smaller volumes than compliance that includes dilution.

Comment:

Another flaw in the load allocations relates to the assumption that all "spill 'resets' the TDG levels for the water that passes over the spillway and for any entrained powerhouse water." At Rock Island Dam, studies are underway to develop a method of spill that does not entrain air and, therefore, does not "reset" TDG levels. This submerged spill will neither increase nor decrease TDG levels from what is present in the forebay. Thus, when forebay conditions exceed the TDG criteria, this type of spill will also exceed the criteria although no additional TDG was introduced. The load allocations should instead be based on TDG in the fully mixed water below the dam and the load allocation should be based on the allowable increase in TDG of the mixed water rather than the TDG level in the spillway.

Response:

Spill was considered to be the traditional spill over or through the dam structure that results in entrained air. The type of spill explained in the above comment will be given special consideration for the purpose of determining compliance with load allocations. Language has been added to the *Summary Implementation Strategy* to provide for this kind of allowance if forebay levels exceed the allocations during fish passage season prior to full implementation of this TMDL The TMDL has been modified in consideration of potential high TDG levels from outside sources during the non-fish passage season.

Comment:

TMDL load allocation must be related to a dam's increase in TDG.

The draft TDG TMDL document contains an extensive discussion of the Clean Water Act, the Endangered Species Act and Washington State's water quality standards. It should also describe important legislation regarding Section 401 of the Clean Water Act that was enacted last year by

the Washington State Legislature as S. 5028. This new law concerns the application of Section 401 of the Clean Water Act and provides:

With respect to federal energy regulatory commission licensed hydropower projects, the department may only require a person to mitigate or remedy a water quality violation or problems to the extent there is substantial evidence that such person has caused such problem. RCW 90.48.422(3).

This new law clarifies that the scope of any TDG TMDL measures imposed on a hydroelectric licensee as part of a Section 401 certification is limited and can only address water quality problems caused by such licensee. In other words, a FERC licensee whose project is wholly within Washington State cannot be required through a Section 401 certification to remedy or mitigate TDG levels in the Columbia River that the licensee itself did not cause. EPA and the Department of Ecology must factor this statutory requirement into the TDG TMDL, including the TDG load allocation. For example, a 401 certification cannot require that a project reduce TDG concentrations caused by upstream projects because that would violate the causation/ responsibility principle of 5028.

This defect in the load allocation is demonstrated by the discussion on page 61 regarding compliance when forebay levels exceed 115%. Table 7, footnote 6, is unclear but appears to require a reduction in the fish spill necessary to protect a beneficial use, as a result of non compliance at the upstream projects. If the load allocation were based on an individual dam's incremental increase in TDG, as it should be, this dilemma could be avoided.

Response:

Projects create reservoirs, and reservoirs inhibit gas equilibration/decrease following an increase over saturation whether it be natural or unnatural. The effect of reservoirs on dissolved gas is the increase of temperature and decrease in surface agitation that would normally occur in a naturally flowing river. Wind over the surface of the water creates some gas exchange with the creation of waves. Each project could be responsible for a portion of the upstream gas levels because it is creating the environment that inhibits gas reduction.

It is difficult to measure what the net effects are from creating reservoirs, so the current method has been proposed as a workable solution. Each project assumes responsibility for all the gas levels in its downstream forebay in exchange for foregoing its responsibility for lack of degassing in its reservoir. This is the "no net change" approach. The approach of this TMDL in allocating loads is to not hold the project responsible for upstream forebay TDG, but require that the project manage spills differently than they would if TDG levels were at natural saturation.

Footnote 6 to Table 7 only refers to non-fish passage conditions. Footnote 5 to Table 7 resolves a dilemma created when downstream forebay levels cannot be met due to upstream forebay conditions. The standards are silent on how to deal with this situation. The TMDL cannot be based on other sources being out of compliance, but the TMDL also cannot address sources outside its jurisdiction, such as TDG originating in Canada. Therefore it is appropriate for the TMDL to consider loadings at levels below the criteria in the standards when background sources prevent compliance with the standards.

However, further analysis has *shown* that powerhouse expansion projects at Canadian dams and implementation of a TDG TMDL on the Pend Oreille River, along with full implementation of the Mid-Columbia TDG TMDL, should eliminate forebay levels above 115% under all conditions except flows above the 7Q10 flood flow. Therefore, Footnote 5 to Table 7 has been removed.

In consideration of the potential for background levels of TDG to be greater than 115% prior to the completion of TDG reduction measures outside the TMDL study area, a compliance strategy is presented in the *Summary Implementation Strategy*. The long-term prospect for low background TDG for flows less than the 7Q10 flood flow is good, based on planned improvements in Canada and the implementation of tributary TDG TMDLs.

The incremental increase allowed when the background TDG violates the criteria is zero.

Comment:

We should be banning all two-cycle engines on private water craft (pwc's) from Lake Roosevelt, not establishing how much dissolved gas we can put in. Keeping pwc's off Lake Roosevelt would have a very positive impact on visitor use, short term and long term as well as environmental benefits.

Response:

There are many environmental issues associated with Lake Roosevelt addressed by different entities according to jurisdiction. The state and EPA are legally required under the Clean Water Act to issue TMDLs to address impaired waters, such as Lake Roosevelt's TDG impairment. Though TDG impairment does not directly harm local residents, mammals and birds, it can be deadly for fish. The gas that this TMDL addresses is not motor gasoline but entrained or dissolved gas, mostly nitrogen from the atmosphere.

Specific Comments

Abstract

Page v, paragraph 4.

Comment:

Request changing the language in the following statement:

"An implementation Plan prepared by Ecology and the Spokane Tribe describes proposed measures that could be used to reduce TDG levels in the Columbia River."

Response:

The suggested change has been made.

Executive Summary

General Comments.

Comment:

The Colville Tribe water quality standards do not allow excursions of the 110% standard to facilitate fish passage spills. The multiple TDG standards applied throughout the Mid-Columbia River could result in system operations limiting spill at the two dams with the more rigid water quality standards (Chief Joseph and Grand Coulee Dams) forcing high spillage rates throughout the remainder of the Mid-Columbia River. This type of operation is likely to result in higher TDG saturations in the lower river where higher densities of ESA listed species are likely to occur. Are there any safe guards in the TMDL that could prevent this potential outcome?

Response:

TMDLs are written to meet water quality standards of the state of Washington, Colville Tribe, and Spokane Tribe. As you noted, the water quality standards of the Colville Tribe do not allow for exceedences of the 110% TDG criteria. Thus, the allocations for Chief Joseph Dam and Grand Coulee Dam do not provide for any such exceedence. The *Summary Implementation Strategy* has been written to coordinate with the 2000 Columbia River Power System Biological Option and provides the flexibility to address such situations.

Comment:

An explicit statement of the designated loading capacity for each river reach as referenced in the Executive summary would be helpful. The reference to a non-fish passage TMDL loading capacity for five reaches is confusing because of the subsequent reference to eight reaches.

Response:

This has been revised for clarity.

Comment:

Does the Monitoring plan require a station in the forebay of each dam to determine long term compliance?

Response:

The forebay monitoring stations are currently part of the monitoring strategy for this TMDL, and will likely continue to be in the long-term. Forebay monitoring is *needed to gauge compliance*

with the fish passage allocations. For non-fish passage, the term "compliance area" was deliberately chosen instead of "point of compliance" because compliance is required throughout the river from each dam downstream. Forebay monitoring determines compliance at the downstream end of each compliance area.

Page ix, Pollutant Allocations, paragraph 4.

Comment:

Why is the Compliance area for Grand Coulee at the end of the aerated zone, while all other projects are at the end of the aerated zone? If additional studies are needed at Grand Coulee to determine an accurate compliance area then this information should be stated in the TMDL.

Response:

We assume this comments asks why the compliance area for Grand Coulee begins at the base of the dam, while below other projects the compliance area begins below the aerated zone. As the TMDL explains, the primary reason is that Grand Coulee has sufficient powerhouse capacity for flows up to the 7Q10 flood flow, so involuntary spill is avoidable (if a market for the load can be found). A secondary reason is that inadequate information is available to determine the size of the aerated zone and whether excluding the aerated zone from the compliance area is appropriate. The primary reason is adequate by itself, but the secondary reason lends weight to this determination.

Comment:

Regarding: *Because of the Seasonal Variation, the Load Allocations Should Be Limited To Periods of Fish Spill:*

The TMDL states that the load allocations apply between March through September of each year except in areas above Grand Coulee Dam. (Executive Summary p. x.). However, the TMDL document states that spill for fish passage generally occurs between mid-April through August of each year (p. 14) rather than March through September. Analysis of TDG data outside of the fish spill season (September through March) indicates that within the Columbia River occupied by the Priest Rapids Project, the months of March and September should be excluded from the load allocation.

Response:

Both fish passage and non-fish passage allocations must be included for several reasons. Portions of the TMDL season fall outside of the fish passage period, which is determined by the Endangered Species Act Technical Management Team and/or other governing structures. Waters of Lake Roosevelt and Tribal waters do not have fish passage allocations. Also, in state waters downstream of the Okanogan River confluence, fish passage allocations are only in effect when Ecology has approved a gas abatement plan. If that approval is withdrawn, the non-fish

passage allocations are in effect. For these reasons, both sets of criteria are applicable, and the TMDL must include them.

Introduction

General Comments.

Comment:

Does the State of Washington share jurisdiction of the Columbia River with the Colville Tribe?

Response:

Yes. The southern boundary of the Colville Reservation lies in the Columbia River. Thus, Washington State and the Colville Tribe each have jurisdiction over a portion of the river in that area where the reservation borders state lands. The water quality standards of the Colville Tribe apply to waters of the Colville Reservation, and those of the state of Washington apply to state waters.

Page 2, Figure 1.

Comment:

Noxon dam on the Clark Fork is shown as a Corps dam when it is not. The Dams in Canada on the Kootenai and Pend Oreille River are not shown. The Spokane River is not shown in Figure 1.

Response:

The figure has been deleted.

Total Dissolved Gas Water Quality Standards

Page 11, TMDL Targets, paragraph 3.

Comment:

States *the implementation plan allows compliance with waiver limits through at least 2010, should the Colville Tribe choose to adopt them, as an interim allowance for compliance with the TMDL*. How does this statement pertain to the Grand Coulee-Chief Joseph spill/power swap? Does this statement imply that in 2011 the TMDL will no longer allow a waiver of the 110% criteria for the spill/power swap? Please clarify.

Response:

The wording of this paragraph has been revised for greater clarity. The TDG criteria in the Colville Tribe's water quality regulations is 110%. There are no special criteria which apply during fish passage spills as is present within the Washington State water quality standards. However, the Colville Tribe has verbally agreed to evaluate compliance with the 2000 /Biological Opinion. We suggest that the dam management agencies work directly with the Colville Tribe on this issue.

The intent of the TMDL and the *Summary Implementation Strategy* is a phased approach to implementation that uses the 2000 Columbia River Biological Opinion timeline. In that Biological Opinion, the year 2010 was anticipated to be the timeframe when fish passage actions would have met the survival goals for juvenile salmon, and fish passage spill might no longer be required. It is a point where the efforts made in the Columbia would be evaluated for effectiveness and a determination made whether spill for fish passage was still needed.

Comment:

Page 14, It should be noted that involuntary spill events described on page 14 (i.e. lack of power market, turbine maintenance, etc.) occur infrequently.

Response:

Ecology and EPA have not reviewed information that quantifies the frequency of these kinds of involuntary spills. Therefore, a quantitative or qualitative description of the frequency of involuntary spill is not justified.

Water Quality and Resource Impairments

Page 15, TDG Generation from Spills, paragraph 2.

Comment:

States *The excursions beyond criteria usually have been no more than one or 2% above the criteria and occur as a result of the imprecision in reproducing exact TDG levels at specific spillway gate set points due to all the sources of TDG variability described.* Excursions beyond criteria most often occur because of forced spill. Excursions during voluntary spill can occur because regional fisheries agencies would like the projects to operate as close to the TDG criteria as possible. There remains a degree of uncertainty relating specific operating conditions to the response at a single sampling station located either in the tailwater or forebay of the downstream project.

Response:

This section has been revised for clarity.

Comment:

Regarding: *Effects of Operations at Federal Projects:*

A significant amount of the discussion is spent on the requirements of the federal Biological Opinion RPA requirements but makes no mention of the fact that the Biological Opinion is on remand to the agencies and will likely be changed.

Response:

The remand leaves the BiOp in effect and will not likely change the requirement for the spill program. However, mention of these developments has been included.

Comment:

Additionally, the TMDL should indicate that operations outside of the hourly coordination agreement including when the program control "bias" is blocked, may result in shifting flows to low power demand times at other "run-of-the-river" projects downstream resulting in additional involuntary spill. Page 14 should also reflect the complete name and citation for the Hourly Coordination Agreement as: "Agreement for the Hourly Coordination of Projects on the Mid-Columbia River," effective July 1, 1997 through June 30, 2017.

Response:

The TMDL has been revised to include this information.

Comment:

Regarding: *The Discussion of Monitoring Requirements is Inconsistent and Should be Simplified:*

The monitoring point for compliance downstream of each dam is stated to be the FMS location during fish spill and at the end of the aerated zone in the spillway during other times of the year (Executive Summary p. x). Additionally, the TMDL states that the FMS sites will continue to be the primary location for attainment of TDG saturation limits used for fish passage management and the TMDL will not be used to drive FMS siting issues (Executive Summary p. x.). The last paragraph of page 19, however, ambiguously describes a long-term goal of measuring TDG in spillway water only. This statement is not congruent with the discussion on p. x of the Executive Summary providing that continuous monitoring will be used for long-term compliance with non-fish passage allocations by determining the statistical relationship between continuous monitors and conditions in the compliance areas. We believe that further inconsistent statements are made again at p. 66 indicating that it would be "desirable to monitor throughout the compliance areas and especially at the boundaries."

Response:

The TMDL has been revised to improve clarity on this issue.

Identification of Sources

Comment:

This Draft TMDL establishes a "load allocation" for a geographical location, in this case, at the international border. In our opinion, establishing a "load allocation" for a geographical delineation of the international border is inappropriate because the border is not a source of TDG and does not fit the EPA definition of "load allocation" at 40 CFR § 130.2(g):

> "The portion of a receiving water's loading capacity that is attributed either to one of its existing or future non-point sources of pollution or to natural background sources..."

The actual sources of TDG are upstream and will be addressed individually in the future either through Canada's environmental regulations or, in the case of U.S. sources, through a TMDL.

Text clarifying that "the U.S. has no direct authority over attainment of this load allocation" and that the purpose of numeric analysis for the geographical location of the international border is to "provide a target that can be used during discussion and negotiations with Canadian sources" is appreciated. (Draft TMDL, p. 25). However, the use of the term "load allocation" appears to conflict with the EPA regulations, therefore, any number would be better referred to simply as a "target."

Response:

Though load allocations are typically given to specific sources of a pollutant (point sources, non-point sources, or background), it is not unusual in circumstances where pollution is coming from upstream sources outside the TMDL area to set a load allocation at the upstream boundary of the TMDL area**.** In the case of loadings crossing the international border, this is considered to be a background loading and is thus consistent with the definition of a load allocation. These load allocations are then used in the upstream efforts to address water impairment. For example, this was done in the Lower Columbia River TDG TMDL.

Comment:

Regarding: *Identification of Other Sources:*

The TMDL identifies each of the 7 dams as the only sources of TDG within the geographic scope of this TMDL (P. 25). Although the TMDL identifies several tributaries in Lake Roosevelt and in Canada as sources, none of the tributaries below Grand Coulee dam are identified. The large tributaries, like the Wenatchee, Okanogan, Methow, and Entiat rivers are likely to contribute inflows with elevated TDG levels during the spring run-off. There appears to be a significant assumption in this TMDL that the level of contribution is negligible without supporting analysis.

Response:

The four tributaries mentioned have been evaluated indirectly as part of TDG studies on the Columbia River. Although it is likely that TDG may be supersaturated in these tributaries under certain conditions (such as high water temperatures or high dissolved oxygen from productivity), there have been no indications of TDG levels in these tributaries that contribute to impairment. In fact, data suggest that they often serve to provide low-TDG dilution water during spring runoff. Regardless, the percentage of Columbia River flow during the TMDL season that these tributaries represent is very low. Therefore it is reasonable to consider these tributaries to be negligible contributions to impairment.

Comment:

This response action by downstream project owners/operators may not be fully reconciled with RCW 90.48.422(3) which provides: "With respect to federal energy regulatory commission licensed hydropower projects, the department may only require a person to mitigate or remedy a water quality violation or problems to the extent there is substantial evidence that such person has caused such problem."

Response:

The FERC licensing activities of the department are distinct from the federal requirement to develop TMDLs. The purpose of a TMDL is to determine the cumulative effect of pollutant loads that cause water quality problems, and then allocate loads in a way that solves the problem. In effect, the TMDL allocates responsibility to multiple sources that together cause a problem.

Loading Capacity

General Comments.

Comment:

Did the TMDL for the Snake and Lower Columbia River express formal load allocations accommodating the fish passage special conditions?

Response:

The Lower Snake River TDG TMDL included fish passage special conditions, while the Lower Columbia River TDG TMDL did not.

Linkage of TDG Loading to the Criteria, Table 6.

Comment:

From Table 6 it appears that Chief Joseph Dam Tailrace must meet 73 mm Hg above saturation at all times (about 110%), but Wells Forebay has a waiver of 115% for fish passage. Where will this additional TDG be coming from between Chief Joseph Dam and Wells Dam? There appears to be a discontinuity with TDG loading in the TMDL due to combining the State of Washington's water quality standards with the Colville Tribe's water quality standards.

Response:

Managing such discontinuities is a challenge for this TMDL, but EPA and Ecology believe the TMDL does so adequately. If Chief Joseph Dam is meeting 110% (73 mm Hg), then the Wells Dam forebay will meet 115%, so this does not appear to be a problem. If the Colville Tribe were to issue a modification of water quality criteria for Chief Joseph to meet fish passage criteria in its tailrace, it will still need to meet the forebay allocation at Wells.

Comments:

There appears to be a disagreement between Tables 6 and 7 pertaining to TDG in the Columbia River Reach from the Yakima River to Snake River. Table 6 states that this reach must meet 75 mm Hg above saturation (about 110%) for all conditions, while Table 7 states this 75 mm Hg value is only for non-fish passage conditions and does not state a fish passage value. Which table is correct?

Regarding: *The Load Allocation From the Yakima River to the Snake River Should be Clarified:*

Table 7 at p. 61 provides that the load allocation from the Yakima River to the Snake River during the non-fish passage period is 75 mm Hg above saturation and meets the upstream load allocation set by the TMDL for the Lower Columbia River TDG TMDL. However, Table 6 at p. 59 provides that this load allocation applies under all conditions. We believe that the description of the load allocation in Table 6 as applied during the fish passage season is incorrect. The application of this loading allocation (75 mm Hg) during the fish passage season could significantly curtail spill management policy at projects in the Mid Columbia river reach.

Since McNary Dam is downstream of Priest Rapids Dam, the 115% load allocation during the fish passage season should be specified for the Yakima River to the Snake River in both Tables 6 and 7. Otherwise, a load allocation of 75 mm Hg above saturation conflicts with WAC 173-201A-200(1)(f)(ii) which provides that the criteria for fish passage is 115% saturation at the forebay of the next downstream dam which is McNary. A load allocation during the non-fish passage season is unnecessary and should be eliminated for the reasons discussed above.

Response:

Table 7 is correct, and Table 6 has been modified to be consistent.

Comment:

There appears some discontinuity in the TMDL between Priest Rapids Tailwater and the Yakima River to Snake River reach of the Columbia. The TMDL allows Priest Rapids to spill up to 120 to 125% for fish passage, but the TDG must be only 75 mm Hg above saturation (about 110%) at the confluence of the Snake River. Is obtaining 110% by the Snake River confluence feasible, or would 115% be a more reasonable value.

Response:

Table 6 has been revised to eliminate this confusion.

Comment:

Table 6 shows the loading capacity for the Yakima River to Snake River for all conditions of 75 mm Hg. Is this correct? If it is correct, would upstream project be bound to operations meeting this condition year-round?

Response:

Table 6 has been revised to show that 75 mm Hg applies during non-fish passage.

Comment:

Page 59, Table 6: There is no mention of approved gas abatement plans for Federal dams. Is this an oversight, or are Federal dams exempt?

Response:

Federal dams are not exempt from water quality standards. Gas abatement plan approvals continue to be required by the state of Washington before special fish passage criteria can be applied to a dam in state waters. The gas abatement plans are not anticipated to be needed at Grand Coulee Dam due to the ability to pass all flow volumes below the 7Q10 flood rate through the turbines. The COE, operator of Chief Joseph Dam, has received approvals for gas abatement plans submitted in the past.

The two federal dams addressed by this TMDL are in shared waters of the state and the Confederated Tribes of Colville. Because the Colville Tribe water quality standards contain no special criteria for fish passage conditions, no fish passage load allocations were given to these dams. If the Tribe were to grant a water quality criteria modification for fish passage spill, gas abatement plans would also be required to obtain a state waiver for fish passage spills at these dams.

Comment:

Page 60, footnote 1: Footnote 1 states that "the Courts have determined the characterization of dams as point sources for which NPDES permits will not be issued for certain parameters. The current policies of the state of Washington are to not issue NPDES permits for TDG."

This statement is confusing. It could be construed to imply that hydroelectric dams are point sources but that EPA and Washington State do not require NPDES permits for such dams as a matter of policy. It should be revised to clarify that, consistent with National Wildlife Federation v. Gorsuch, 693 F. 2d 156 (C.A.D.C. 1982), NPDES permits may not be required for dam-induced total dissolved gas under Section 402 of the Clean Water Act. In Gorsuch the Court upheld EPA's position that dam-induced water quality problems are non-point pollution and therefore are not subject to the requirements of the NPDES permitting program under Section 402

Response.

The Gorsuch ruling, rather than federal or state policy, is the basis for the determination that flow of water over and through dams impaired by dam operations does not constitute an addition of pollutants as defined by the Clean Water Act. The Gorsuch ruling states that an NPDES permit is not required, but does not forbid a state from issuing an NPDES permit to a dam. Washington State and EPA policy is to not require NPDES permits for parameters impaired by hydropower dams but where no pollutants are discharged. (Oil or wastewater might still require an NPDES permit.) The footnote is intended to explain why dams receive load allocations and not wasteload allocations as required for point sources subject to NPDES permits.

Load Allocations

Page 61, paragraph 2.

Comment:

Considerable detail is given on how dams are to manage spill when forebay levels exceed 115%. However, Grand Coulee and Chief Joseph do not fall into the 115% waiver category of dams. Please provide a detailed explanation on how Grand Coulee and Chief Joseph should meet the allocations in this TMDL when forebay levels exceed 110%.

Response:

The operating principle here is to make every attempt to decrease the TDG level of the river and, failing in that, at least not increase the TDG level of the river. Water passing the dam that is not spilled is not subject to the allocations. Spilled water must still meet the 110% criteria or the delta p allocation of the TMDL. Grand Coulee can meet the allocation by not spilling. Chief Joseph can be in compliance through a combination of not spilling, limiting spill to levels that

meet the allocation in the compliance area, or obtaining a waiver from Ecology and a water quality criteria modification from the Colville Tribe to meet fish passage criteria.

Page 61, Table 7.

Comment:

Note 1 states "For each dam other than Wells Dam, if the upstream forebay exceeds the load allocation, then this allocation shall apply to the portion of the river in the compliance area that represents spill from the dam least affected by mixing with the portion of the river carrying forebay TDG levels." This explanation is extremely cumbersome and difficult to understand. Can the procedures for how the TMDL works when the forebay levels are above 110% at Grand Coulee and Chief Joseph be explained in a more succinct manner? What are the procedures for non-fish passage dams when forebay levels exceed the load allocation making it impossible to meet the load allocation at the tailwater of the next downstream dam?

Response:

This footnote has been revised, and procedures have been included in the *Summary Implementation Strategy* for this situation.

Comment:

The load allocations increase by 1 mm Hg increments. Is it possible to accurately measure TDG to 1mm Hg given the quality of the current instrumentation? Even if an instrument is plus/minus 1 mm Hg it could be off by 2 mm Hg from another instrument and still be within data QA

Response:

It is possible to measure TDG to 1 mm Hg, but generally instrument measurements are less precise. In determining compliance with the TMDL, the variability of monitoring data quality will be taken into account.

Comment:

How does the Mid-Columbia TMDL fit together with the Lower Columbia TMDL at the Snake River confluence? For fish passage, Priest Rapids Dam can have TDG up to 120 to 125% in the tailwater, and Tables 6 and 7 note that the TDG must be 75 mm Hg above saturation (about 110%) in the Yakima River to Snake River reach. Is it possible to have spill at Priest Rapids up to 125% and still have the TDG be 110% at the confluence of the Snake River?

Response:

The Lower Columbia TDG TMDL was based solely on non-fish passage criteria, because the state of Oregon adopts fish passage criteria as temporary. However, fish passage criteria are included in the *Summary Implementation Strategy* as an interim measure.

Although the Lower Columbia TDG TMDL takes a different approach from the Lower Snake and Mid-Columbia TDG TMDLs, care has been taken so they align properly. Non-fish passage allocations in the body of the Lower Columbia TMDL line up with non-fish passage criteria in the bodies of the other two TMDLs, while fish passage criteria in the *Summary Implementation Strategy* of the Mid-Columbia TMDL line up with the fish passage criteria in the body of the other two TMDLs.

If fish passage criteria cease to be in effect in the Lower Columbia River, either because the *Summary Implementation Strategy* has been modified or because Phase 2 of the *Summary Implementation Strategy* has begun, then the fish passage allocations in the Lower Snake and Mid-Columbia TMDLs can be removed by withdrawing approval of the dams' gas abatement plans.

Comment:

What is the Fish Passage Load Allocation below the tailrace of Priest Rapids Dam (Table 7)? If the load allocation is 75 mm Hg year round as suggested in Table 6, then this criteria would directly influence the levels of generation of TDG by upstream projects in the Mid-Columbia River and limit voluntary spill operations.

Response:

During fish passage, the Priest Rapids tailrace allocation is the farthest downstream allocation in this TMDL. The fish passage criteria for McNary forebay would then be in effect. This is intended to be entirely consistent with the current application of fish passage waiver levels through the Endangered Species Act process. The allocation of 75 mm Hg only applies during non-fish passage conditions.

Comment:

Regarding: *The Response To High Forebay TDG Levels Should Be Clarified When Flows are High and Spill Cannot Be Reduced:*

The TDG TMDL identifies a new approach to managing high forebay TDG levels. On the one hand, the TMDL provides that the downstream dam is not responsible for upstream TDG levels. (p. 60). However, footnote 5 of Table 7 implies that the downstream project owner will be held responsible if it fails to take the action of reducing spill to 115% in its tailrace when it encounters high forebay TDG levels resulting from upstream operations

As a practical matter, when high forebay TDG levels are encountered, spill is reduced if there is available powerhouse capacity and the upstream project owner/operator is notified. But there may be circumstances where the downstream project owner/operator may not be able to reduce spill to 115% due to high flows and inadvertent spill in the system has elevated TDG levels to their maximums. Accordingly, we recommend that footnote 5 be revised to recognize that spill will be reduced 1) if feasible and 2) as soon as reasonably practicable.

Response:

The TMDL must be based on meeting water quality standards under all applicable conditions, which for TDG is all flows below the 7Q10 flood flow. However, the TMDL also recognizes that high gas levels entering U.S. waters from Canada are outside the jurisdiction of this TMDL. If this were to occur, this upstream background condition would effectively reduce the capacity of the river, thereby requiring a reduced allocation. Due to the unlikely occurrence of such an event, the compliance strategy for the high forebay level has been revised by removing footnote 5 on Table 7 and placing this requirement as guidance in the *Summary Implementation Strategy*.

The requested reference to feasibility and practicability is also included through equivalent language in the *Summary Implementation Strategy*.

Comment:

The footnotes in Table 7 would appear to constitute new guidance for spill operations during the fish passage season under certain conditions. Is the following interpretation of this policy correct? If forebay TDG levels at a project exceed 115% then setting spill rates such that the TDG generation associated with this spill is 115% or less is required so that a downstream load allocation will not be in effect.

Response:

We would slightly reword your interpretation of the policy: If downstream forebay TDG levels at a project cannot meet 115% because upstream forebay levels exceed 115%, then setting spill rates such that the TDG generation associated with this spill is 115% or less in the tailrace is required and the downstream TDG allocation will not be in effect.

A TMDL sets the allocations so that the water body attains standards. Normally, an allocation is established at each discharge that assures that the combined discharges do not exceed the standards. Columbia River TDG TMDLs are unique in that there is near-continual monitoring of the river system for TDG during the spill season. This allows a narrow margin of error to be used in determining allocations. One drawback is that upstream TDG generation can cause exceedances of the criteria. Allowing the downstream dam to discharge 120% TDG in tailwater would increase the next forebay's fully mixed waters' TDG further over the forebay limit of 115%. Below the 7Q10 flood flow rate, dams must provide a means to pass water without creating elevated TDG levels in order to meet the TDG standards.

Long-term Attainment of Water Quality Standards, Page 62, paragraph 3.

Comment:

This paragraph assumes that spills below the 7Q10 flow are not flood control spills. However, Grand Coulee can spill from the outlet works in March, April, and May for flood control operations because the reservoir needs to lower the pool rapidly to prepare for future flood flows. This scenario happened in 1997 resulting in high TDG levels in the Columbia River and is why

the Water Quality Team investigated the possibility of joint operations with Chief Joseph Dam. Thus, the TMDL should note that flood control operations at Grand Coulee can occur during the spring when flows are less than the 7Q10 flow and the reservoir is being operated to lower the pool for future flood conditions.

Response:

Grand Coulee has turbine capacity to address flood control below 7Q10; this is reflected in the TMDL. The *Summary Implementation Strategy* lists the need to find a market for power during the spring flood period and joint operations with Chief Joseph.

Long-term Attainment of Water Quality Standards, Page 63, Table 8.

Comment:

The information contained in Table 8 needs to have the following qualifications. The production equations were applied outside of the range of flow conditions they were developed for (extrapolation of observed trends and greater uncertainty associated with this type of forecast) in some cases. The different equations applied reflect different metrics of TDG exchange. In the case of Wanapum Dam the maximum TDG pressure in spillway water undiluted with powerhouse flow was the parameter reported. The relationship applied for Wells and Rock Island Dam reflect average river conditions and not local conditions in spill water. This table can be misleading if used to compare TDG exchange between projects.

Response:

The footnotes in Table 8 are intended to indicate the source of the estimates and the differences between estimates. The table is provided as an illustration and the TDG levels reported as estimates. The TMDL has been revised to make this clearer.

Comment:

Table 8 misstates the powerhouse capacity for Wanapum Dam and then makes a non standard comparison of TDG generation with other mid-Columbia projects. In preliminary comments filed with WDOE, Grant PUD reported that Wanapum Dam had a powerhouse capacity of 178 kcfs with all 10 units and 160 kcfs with 9 units running. A 95% powerhouse capacity at Wanapum Dam is 169 kcfs, with a 7Q10 spill of 95 kcfs. These should be the figures used in Table 8. WDOE incorrectly relies on the Corps 2000 study which did not base statements on powerhouse capacity on an engineering analysis.

Response:

Table 8 has been revised to reflect Grant PUD's reported powerhouse capacities.

Comment:

Table 8 is also misleading in that it compares the maximum TDG readings for Wanapum and Priest Rapids dams recorded immediately bellow the spillway, rather than the area below the aerated zone, with TDG levels reported at locations that are farther downstream at Wells, Rocky Reach and Rock Island dams. Additionally, the table reports flow-weighted average TDG levels in the Rock Island study rather than maximum TDG levels.

Response:

The equations chosen were for TDG generation below the aerated zone of each dam, as close to the dam as information was available in existing studies. Due to differences between study analyses, the locations of the estimates vary. A perfect "apples-apples" comparison is not possible with existing information, but the estimates provide some insights to the status of TDG allocation compliance at each dam.

Comment:

Footnote 7 is also misleading. For Priest Rapids Dam, the maximum TDG reported was 129% saturation collected in the stilling basin yet the footnote states that it was collected below the aerated zone. Additionally, the reading was taken from a spill of 145 kcfs at a total river flow of 272 kcfs. Not only do these flows exceed the 7Q10 flood flow for Priest Rapids Dam, the resulting TDG levels should not be used in a table comparing TDG levels at other projects that were taken during much lower spillway and total river flows.

Response:

The TDG values reported in Table 8 are based on equations for the location described in the footnote. Therefore the maximum measurement described in this comment was not used.

Comment:

Additionally, the data for Wells Dam reflects average river conditions and was not based on a site specific study at the same level of detail associated with Wanapum and Priest Rapids Dams. In fact footnote 4 states that the data is based on the downstream FMS. Accordingly, the table entry for maximum TDG should be reported as "N/A" for Wells Dam because the data simply has not been collected and analyzed in a comparable manner and appears to rely on the tailwater FMS level.

Response:

Wells Dam represents a unique situation, and comparison to other dams is difficult. Although the calculation at Wells differs, a comparison is still useful. The assumed upstream TDG level has been changed to 115%.

Comment:

Since the FMS locations are intended to be the compliance point during the fish passage season, a comparison among the various dams could be shown in Table 8 by using the FMS regressions at each project similar to those found at Table E3-18 of the Final License Application for the Priest Rapids Project. Although the table in the FLA shows 90% powerhouse capacity, if 95% powerhouse capacity were used as shown in Table 8, the regression equations would show 119 and 121.0 % TDG at the resulting 7Q10 spill for Wanapum and Priest Rapids dams respectively. In summary, Ecology should attempt to standardize the TDG exchange estimate for each dam.

Response:

Table 8 does attempt to standardize TDG generation at each dam, by looking at the TDG levels below each spillway separate from mixing with powerhouse flows, where possible. The purpose is to show and compare each dam's TDG generation characteristics. FMS sites were not used (unless no alternative was available) because of the differences in mixing characteristics between the sites.

Compliance Locations, Page 63, paragraph 1.

Comment:

The state and tribes will be responsible for evaluating progress towards attainment of these allocations. What procedures/metrics will be used in evaluating progress towards attainment?

Comment:

The location of tailwater FMS vary widely at projects located in the Mid-Columbia River relative to mixing zone between spillway and powerhouse releases. This inconsistency influences spill management policy, determination of compliance with water quality criteria, and the evaluation of attaining TMDL load allocations.

Response:

This section of the TMDL provides a general approach to compliance. A more detailed description of the approach to determining compliance is provided in the *Summary Implementation Strategy*. This implementation strategy provides for monitoring plans to be developed, which would describe the specific procedures and metrics for evaluating attainment.

Comment:

Regarding: *The Compliance Area Below Priest Rapids Dam Is Unworkable and Unnecessary:*

The Executive Summary at p. ix and in the body of the document at p. 64, states that the compliance area below Priest Rapids Dam extends to the confluence of the Snake River. In each other segment, water travels through a series of reservoirs and the downstream compliance point is the forebay monitor of the next project downstream. Additionally, the downstream compliance point is reasonably close so that the travel time to the downstream monitor will result in meaningful information about the upstream project's operations.

However, Priest Rapids Dam is not similarly situated to other dams because the travel time from Priest Rapids to the confluence of the Snake River is several days or longer. Unlike the mid-Columbia River above Priest Rapids Dam, there are no similar reservoir conditions located immediately below Priest Rapids Dam. Thus, the resulting TDG levels are dominated by in-river processes, such as air-water TDG exchange, thermal heat exchange, biological productivity, and effects of tributary inflows from the Yakima River over which the District has no control. As a result, a downstream compliance point, over 50 miles away through open-river, would not provide meaningful information for operations at Priest Rapids Dam. A more appropriate downstream compliance point is the tailrace FMS location at Vernita Bridge.

The extensive monitoring and analysis contained in the District's Final License Application (Exhibit E-3) demonstrates that the TDG relationships through the Hanford Reach can be managed effectively at the existing FMS at Vernita Bridge for both fish passage and non-fish passage seasons as evidenced by the success of the Vernita Bar Agreement. For the reasons discussed, the Pasco monitor is not reflective of the TDG conditions resulting from operations at Priest Rapids Dam.

Response:

Analysis of TDG in the Hanford Reach indicates that instream process generally reduce TDG. Therefore the only meaningful compliance location is at the upstream boundary of the compliance area – below the aerated zone at Priest Rapids Dam. For real-time operational purposes the tailrace FMS will continue to be where compliance is evaluated. The TMDL must include the entire river in its allocations. Increases in TDG in the Hanford Reach from increases in background processes may reduce the capacity available to Priest Rapids dam. However, this situation is expected to be extremely rare. Priest Rapids Dam will be considered to be in compliance during periods when 110% is the applicable criterion if tailrace FMS monitoring indicates that the tailwater TDG levels below the aerated zone are below 110%.

Monitoring of Attainment, Page 66.

Comment:

The policy of trading spill for power between Chief Joseph and Grand Coulee Dams was based on the reduction in TDG loading in the Columbia River below Chief Joseph and Grand Coulee Dams. How will the more frequent spill events and the associated elevated TDG observations at Chief Joseph be treated when evaluating the progress towards attaining TMDL load allocations?

Response:

The *Summary Implementation Strategy* addresses this situation.

Comment:

This complex and somewhat inconsistent discussion of monitoring and compliance areas is unnecessary. It stems from multiple and inconsistent references to compliance points, compliance areas, fixed monitors and aeration zones which are constructs of this TMDL. Ecology's suggested use of an aeration zone in spillway flows and compliance areas during non-fish passage periods when there is no assigned load allocation* to the confusion.

Response:

Comment noted.

Comment:

For purposes of a TMDL, the amount of pollutant that a waterbody can receive and meet water quality standards can be usually determined from existing FMS locations. In the case of mainstem Columbia hydroelectric projects, the powerhouse flow is much greater than the spillway flow outside of the spill season and will dilute TDG pressures from spillway flows due to mixing that occurs below the end of the aerated zone. As a result, efforts to measure TDG only in the spillway flow is inconsistent with the goal of the TMDL which is to measure the carrying capacity of the river as a whole. As a practical matter, the TMDL suggests a potentially more costly monitoring system for each project that will not serve a material environmental objective since the low frequency of excursions outside of the fish passage period does not warrant a TMDL under Ecology's policy 1-11.

Response:

We respectfully disagree that the goal of the TMDL is to "measure the carrying capacity of the river as a whole". That task is actually a single step of the overall TMDL, whose goal is to ensure that water quality standards are met. Water quality standards for TDG for all conditions except designated fish passage periods on the Columbia and Snake rivers is 110% "to be met at any point of measurement," i.e., at all locations and all times. The standards also provide for a "mixing zone" where standards do not have to be met, which in this TMDL is used to exclude

the aerated zone from compliance. A variety of requirements must be met to allow the use of the mixing zone exemption, such as meeting AKART (all known available and reasonable pollutant abatement methods), meeting a public interest need, protecting beneficial uses, and minimizing the size of the zone. These requirements are the reason that only the aerated zone is exempted, and not the entire river for miles downstream.

Comment:

An analysis of hourly measurements recorded during the non-fish spill season (September through March) between Wanapum Dam forebay and Vernita Bridge in 1995 and from 1999 – 2001 were <110% saturation for more than 98% of the time. The maximum percentages ranged from 0-6% at the Priest Rapids Project tailwaters during the same time period. (Priest Rapids Project Final License Application (FLA) Section 3.5.3.2).

The District also recorded the following excursions above the TDG criteria during non- fish spill periods during 2002 and 2003. The resulting compliance with the TDG standard ranged from 97.1 to 96.6%. These data are summarized in the following table.

Excursions Above the 110% TDG Criteria Outside of Fish Spill Season 2002 —2003

Excursions Above the 110% TDG Criteria Outside of Fish Spill Season 2002 –2003				
FMS Location	# observations	# excursions	# excursions permitted for 303(d) list [1]	% compliance
RI Tailrace (Chelan)	N/A	N/A	N/A	N/A
Wanapum Forebay	443	13	53	97.1
Wanapum Tailrace	478	22	57	95.4
Pr. Rapids Forebay	479	15	57	96.9
Pr. Rapids Tailrace	382	13	47	96.6

Water Quality Program Policy 1-1l states that a segment will be placed in the waters of concern category if the number of exceedances is below the minimum required to place it on the 303(d) list, but is 5% or more of the samples. In the present case, the number of excursions are less than 5% of the samples reported in 2002-2003 and from 1999-2001. It is likely that many of these exceedences were caused by thermally induced processes and reflective only of conditions in surface waters. Since a TMDL would appear to be unnecessary under Department policy, it would also appear that a load allocation in this TMDL should be limited to the period when fish spill is occurring because the risk of

TDG exceeding 110% between September through March is negligible. The discussion at p. 69 should also be revised accordingly.

Response:

This TMDL applies only between March and September. The TMDL has been corrected to clarify this. The guidance for 303d listing is not necessarily relevant to a TMDL determination, since they are separate processes with different requirements and goals.

Comment:

Page 69, paragraph 2: States that the risk of TDG exceeding 110% is negligible from October to September. This time period should be corrected to October to February.

Response:

The correction has been made.

Comment:

Additionally, since the load allocation should be limited to periods of fish spill below Grand Coulee Dam, the discussion in Tables 6 & 7 of the load allocations during non-fish spill periods is unnecessary and confusing. Further, the discussion of non-fish passage compliance areas should be eliminated at page 64 and the monitoring for attainment should be limited to the FMS locations. (pp. 66-67).

Response:

Both fish passage and non-fish passage allocations must be included for several reasons. Fish passage allocations apply only during those periods determined by the Endangered Species Act Technical Management Team and when Ecology has approved a gas abatement plan. If that approval is withdrawn or it is outside of the designated season for fish passage flows, the non-fish passage allocations are in effect. For these reasons, both sets of criteria and allocations are applicable.

Seasonal Variations

7Q10 Flows, Page 69.

Comment:

The 7Q10 discharges were determined for each project in the study area. Are events for river discharges greater than the 7Q10 discharge for short durations (several hours) excluded from adherence to applicable water quality standards?

Response:

The water quality criteria include a provision stating that TDG levels during periods of flow above 7Q10 need not comply with the 110% criteria. Therefore, flow events above the 7Q10 flood flow, regardless of duration, are not required to comply with the 110% criteria.

Appendix A

Convergence with the Columbia River Biological Opinions, Page A-2, paragraph 1.

Comment:

Fish passage through the spillway is not always a "relatively benign route for juvenile salmonids to pass the dam." Recent survival studies at Wanapum, Ice Harbor, and The Dalles dam suggests significant mortality rates associated with spillway passage.

Response:

Compared to turbine passage, spillway passage is relatively benign.

Comment:

Page A-4, first bullet: NOAA Fisheries and USFWS have management authority over unlisted species, as well as listed species.

Response:

That may be true, but for the Endangered Species Act actions that affect the implementation of this TMDL, the authority over listed species is relevant.

Comment:

Page A-7, Table A2: This table should cite the compliance schedules filed with Ecology November 15, 2003 and should be separate by dam, not by PUD.

Response:

The table has been revised to incorporate this comment.

Comment:

Page A-7, Table A2: Chelan PUD submerged spill modeling has not been completed.

Response:

The table has been revised to incorporate this comment.

Comment:

Page A-il and A-i2: Clarification is needed to understand which measures apply to each dam.

Rocky Reach and Rock Island Dams are unique, and not all potential measures apply to both.

Paragraph two and five under this section apply only to Rocky Reach, and paragraph three applies only to Rock Island. The four paragraphs on page A-i2 apply only to Rock Island.

Page A-il, paragraph 4: "Fish bypass facilities are currently being installed..." Should read that "A fish bypass facility has been installed at Rocky Reach..."

Response:

The text has been revised to incorporate these comments.

Power Load Redistribution, Page A-8, paragraph 1.

Comment:

How are system wide benefits dealt with in the TMDL? The spill/power swap at Grand Coulee and Chief Joseph would reduce TDG system wide in the Columbia River at the cost of localized increases in TDG in the tailwater below Chief Joseph Dam. How does this TMDL address reducing the average TDG in the river versus increasing the TDG in the tailwater? I see no language to explain how a benefit to the entire Columbia River would be addressed.

Response:

Water quality law does not allow for a localized violation that results in an overall benefit except as allowed in a schedule of compliance. The short-term/long-term strategy of implementation constitutes a schedule of compliance for achieving the water quality standards.

Comment:

The joint operation of Chief Joseph and Grand Coulee Dam have been identified as a means of reducing the TDG loading in the Columbia River. This measure will not provide full compliance with the 110% standard as defined in this TMDL. What component of this TMDL will recognize the implementation of these measures as a beneficial action? Where is the discussion in this TMDL on how progress toward meeting the water quality standard will be measured?

Response:

Progress will be monitored by the extensive monitoring network already in place and described on pages 18 and19 of the TMDL.

Actions by Each Hydroproject-Chief Joseph Dam, Page A-10, paragraph 1.

Comment:

States "The Colville Confederated Tribes may grant a waiver of the 110% standard if the Corps demonstrates reasonable progress in achieving the standard." Where does the above underlined language come from, the Colville Tribal standards or the Colville Tribe?

Response:

The dam operator can apply for a modification of water quality criteria in accordance with Chapter 4-8 of the Colville Law and Order Code. The terms and conditions of the modification will be prescribed by the Director or his or her designee. The paragraph has been modified.

Comment:

States *Flow deflectors that enable compliance with the 110% criterion are expected to be functioning prior to the conclusion of phase I.* The addition of flow deflectors at Chief Joseph Dam is expected to significantly reduce the TDG exchange associated with spillway operations. However, with the uncertainty associated with hydraulic performance of flow deflectors and the potential increase in magnitude and frequency of spill associated with joint operation of Chief Joseph and Grand Coulee Dams it is not clear whether the 110% criterion will be achievable under these conditions.

Response:

The comment has been noted.

Comment:

Spill pattern changes have been implemented at Chief Joseph Dam as a means of minimizing the TDG exchange during spillway operations.

We have reviewed the public review draft implementation strategy, and have some concerns regarding the TMDL compliance area boundaries and Phase II monitoring locations described in Table A-3. The short term Phase I (2004-2010) strategy for implementation activities at Federal dams calls for completion of initial short term actions specified as part of the Reasonable and Prudent Alternative in the National Marine Fisheries Service December 2000 Biological Opinion for the Federal Columbia River Power System. The strategy suggests that long term Phase II actions (2011-2020) will take years to develop, and were not identified. As evaluation of Grand

Coulee/Chief Joseph joint operations proceeds during Phase I, it may be possible to eliminate spill at Grand Coulee when flows are less than the 7 day 10 year flow event, which would make Phase II monitoring of spills a low priority need at Grand Coulee. We recommend that the monitoring strategy be consistent with the implementation strategy, and not include specific default sites for Phase II dissolved gas monitoring. These sites can be better defined based on studies and actions completed during Phase I.

If a decision is made to locate Phase II monitors in mixed spill and power plant flows, the current monitoring site, located in mixed flow approximately 6 miles downstream of the dam may remain our site of choice. However, if a decision is ultimately made to shift monitoring to characterize the gas level in spills, the boundaries of the "aerated zone" will almost certainly vary depending on the spill configuration and discharge rates at a particular facility. There are several possible locations where a TDG monitor might be placed in the Grand Coulee tail race, including at the dam adjacent to the left or right power plants, off the rip-rap below the dam, and at the bridge located approximately 3000 feet below the dam. All these potential monitoring sites would have issues with practicability and representativeness under some spill configurations involving 3 power plants with 24 generating units, 20 outlet tubes (10 at two different elevations), 11 spillway bays, and a tail water which fluctuates as much as 20 feet in elevation.

Response:

The default locations in the monitoring strategy may be changed in the Detailed Implementation Plan. Locating a single monitoring station that detects TDG levels from all spills is difficult, as explained in the comment. This strategy will be discussed as the Detailed Implementation Plan is developed.